

Amended Patent Claims

1. Process for producing an absorbent polymer comprising a first mixing
5 event, in which a plurality of absorbent polymer particles are mixed with a liquid in a mixer, and a second mixing event, in which the liquid is distributed within the polymer particles, wherein the polymer particles in the first mixing event are mixed with a speed such that the kinetic energy of the individual polymer particles is on average larger than the adhesion
10 energy between the individual polymer particles, and the polymer particles in the second mixing event are stirred with a lower speed than in the first mixing event, wherein the first mixing event is a continuous mixing process.
- 15 2. Process according to claim 1, wherein in the first mixing event the polymer particles are back-mixed in such a way that a flow of the new polymer particles entering in the mixer is overlaid by a flow of polymer particles already present in the mixer and opposed to this flow.
- 20 3. Process according to claim 2, wherein the ratio of the opposed flow to the flow of newly entering polymer particles averages 5 to 50 % by wt.
- 25 4. Process according to one of the preceding claims, characterized in that before the first mixing event the absorbent polymer particles have been secondary cross-linked in the surface portion and have been brought into contact with a composition comprising an Al^{3+} ion before the secondary cross-linking.

5. Process according to one of the preceding claims, characterized in that the average speed of the polymer particles in the first mixing event amounts to between 8 and 80 m/sec, in particular between 15 m/sec and 60 m/sec, preferably between 20 and 30 m/sec, and/or the speed of the polymer particles in the second mixing process amounts to under 3 m/sec, in particular under 0.3 m/sec, preferably under 0.03 m/sec.
6. Process according to one of the preceding claims, characterised in that the Froude number in the first mixing event amounts to between 1 and 50, in particular between 1.5 and 40, preferably between 1.7 and 33, and/or in the second mixing event amounts to between 0.001 and 1, in particular between 0.01 and 0.2, preferably between 0.08 and 0.03.
7. Process according to one of the preceding claims, characterised in that a back-mixing from 10% to 30% occurs.
8. Process according to one of the preceding claims, characterised in that the average residence time of the first mixing event amounts to between 5 and 200 sec, in particular between 10 and 100 sec, preferably between 20 and 60 sec.
9. Process according to one of the preceding claims, characterised in that for a safe blending the static pressure build up during the first mixing event amounts to less than 0.1 bar, in particular less than 0.05 bar, preferably less than 0.01 bar.

10. Process according to one of the preceding claims, characterised in that water or aqueous solution is added as liquid.
11. Process according to claim 10, characterised in that the liquid comprises additives, in particular alcohols.
12. Process according to one of the preceding claims, wherein the polymer particles are based on
- (α 1) 0.1 to 99.999 wt.% polymerised, ethylenically unsaturated, acidic group-containing monomers containing a protonated or a quaternary nitrogen, or mixtures thereof,
 - (α 2) 0 to 70 wt.% of polymerised, ethylenically unsaturated monomers which can be co-polymerised with (α 1),
 - (α 3) 0.001 to 10 wt.% of one or more cross-linkers,
 - (α 4) 0 to 30 wt.% of water soluble polymers, as well as
 - (α 5) 0 to 20 wt.% of one or more additives, wherein the sum of the component weights (α 1) to (α 5) amounts to 100 wt.%.
13. Process according to one of the preceding claims, wherein the polymer particles have at least one of the following properties:
- (A) the maximum absorption of 0.9 wt.% NaCl solution is within a range from at least 10 to 1000 g/g SAP granulate,
 - (B) the part extractable with 0.9 wt.% aqueous NaCl solution amounts to less than 30 wt.%, based on the SAP granulate,
 - (C) the bulk density is within a range from 300 to 1000 g/l,

- 5 (D) the pH value for 1 g of the SAP granulate in 1 l water is within a range from 4 to 10,
- (E) the CRC value is within a range from 10 to 100 g/g,
- (F) the AAP value under a pressure of 0.7 psi is within a range from 10 to 60 g/g,
- (G) the AAP value under a pressure of 0.3 psi is within a range from 10 to 100 g/g.
- 10 14. Absorbent polymer obtainable by a process according to one of the preceding claims.
- 15 15. An absorbent polymer comprising water in a quantity within the range from 0.1 to 20 wt.% based on the total weight of the absorbent polymer, which has at least one of the following properties:
- (A1) an AAP value under a pressure of 0.7 psi (50 g/cm²) within a range from 10 to 60 g/g,
- (B1) an AAP value under a pressure of 0.3 psi (20 g/cm²) within a range from 10 to 100 g/g,
- (C1) a CRC value within a range from 10 to 100 g/g,
- 20 (D1) a drop of the AAP value under a load of 0.7 psi of less than 20% after a deterioration through mechanical stress,
- (E1) in a composite of 50 wt.% of the absorbent polymer, 47.5 wt.% cellulose fibres and 2.5 wt.% of a two-component fibre of polypropylene and polyethylene an absorption time determined according to the test methods described herein after a first wetting
- 25 of less than 53 seconds,

5 (F1) in a composite of 50 wt.% of the absorbent polymer, 47.5 wt.%
cellulose fibres and 2.5 wt.% of a two-component fibre of
polypropylene and polyethylene an absorption time determined
according to the test methods described herein after a second
wetting of less than 253 seconds,

10 (G1) in a composite of 50 wt.% of the absorbent polymer, 47.5 wt.%
cellulose fibres and 2.5 wt.% of a two-component fibre of
polypropylene and polyethylene an absorption time determined
according to the test methods described herein after a third
wetting of less than 475 seconds,

15 (H1) in a composite of 50 wt.% of the absorbent polymer, 47.5 wt.%
cellulose fibres and 2.5 wt.% of a two-component fibre of
polypropylene and polyethylene a rewet value determined
according to the test methods described herein of less than 12.55
g/g,

wherein the water is homogeneously distributed within the absorbent
polymer.

20 16. Composite, comprising an absorbent polymer according to claim 14 or 15
and a substrate.

25 17. Process for producing a composite, wherein an absorbent polymer
according to claim 14 or 15 and a substrate and optionally an additive are
brought into contact with each other.

18. Composite obtainable by a process according to claim 17.

19. Chemical products, comprising the absorbent polymer according to claim 14 or 15 or the composite according to claim 16 or 18.
 20. Use of the absorbent polymer according to claim 14 or 15 or of the composite according to claim 16 or 18 in chemical products.
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